

Description of a new species of Volutidae (Gastropoda) from Southern Australia

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ABSTRACT. *Paramoria johnclarki*, sp. nov. is described. It is compared with the sympatric and congener *Paramoria guntheri* (E. A. Smith, 1886).

INTRODUCTION

Areas explored by scuba divers in the accessible places along the southern and western Australian shore as been restricted for a long time to the sponge zone, biotope of Cypraeidae, Genus *Zoila*. Recent extension of the diving exploration to sandy areas, up to now neglected, has allowed the study of volute populations that thrive there, particularly populations of *Paramoria guntheri*, rare until then, and to identify a new congeneric species sharing the same biotope.

These two species differ by stable features within homogeneous populations without intermediate specimens.

Abbreviations

AMS: The Australian Museum, Sydney, Australia.

MNHN: Muséum National d'Histoire Naturelle, Paris, France.

WAM: Western Australian Museum, Perth, Australia.

FAMILY: VOLUTIDAE

SUBFAMILY: CYMBIOLINAE Bondarev 1995

GENUS: *Paramoria* McMichael 1960

Paramoria johnclarki sp. nov.

Figs 1-11, 20, 22

Type Material.

Holotype: WAM 113-95. West Australian Museum, Perth, W. Australia, 41.5 mm x 17 mm, live taken.

Paratype 1: Limpus coll., 46.8 mm x 19.3 mm, dead collected.

Paratype 2: MNHN, 39 mm x 17 mm, dead collected.

Paratype 3: Clark coll., 41.2 mm x 17.8 mm, live taken.

Paratype 4: Clark coll., 36.8 mm x 17.8 mm, broken specimen.

Paratype 5: Dixon coll., 43.4 mm x 17.9 mm, live taken.

Paratype 6: Dixon coll., 42 mm x 18.4 mm, dead collected.

Paratype 7: AMS n° C325301, 40.3 mm x 17.6 mm, dead collected.

Paratype 8: Museum of Victoria n° F.81094, 42.5 mm x 17.6 mm, dead collected.

Paratype 9: Bail coll., 38 mm x 16.4 mm, dead collected.

Paratype 10: South Australian Museum n° C 18985, 42.8 mm x 18.5 mm, dead collected.

Paratype 11: Limpus coll., 38.6 mm x 16.6 mm, dead collected.

Paratype 12: Limpus coll., 36.6 mm x 16 mm, dead collected.

Paratype 13: AMS n° C325301, 41.4 mm x 18 mm, dead collected.

Paratype 14: WAM n° 95-95, 41.2 mm x 17.6 mm, dead collected.

Paratype 15: Clarkson coll., 39.9 mm x 18.8 mm, dead collected.

Type Locality.

W. Australia, S.W. of Esperance, Archipelago of the Recherche, 35m, on sandy bottom.

Other Localities.

Paratype 1, from between Caiguna and Eucla, Great Australian Bight.

Paratype 15, from Taylors Island, Thorney Passage, S. Australia.

All other paratypes are from the Archipelago of The Recherche, S-E of Esperance, W. Australia.

Habitat.

Paramoria johnclarki is taken by scuba divers in 35 m on limestone rubble, weed sponge and sand, from the Archipelago of The Recherche, south coast of West-Australia. One specimen has been trawled in 120 m, between Caiguna and Eucla, Great Australian Bight; two specimens taken by scuba divers in 25 m west of Taylors Island, Thorney Passage, south of Port-Lincoln, South-Australia; and one specimen dredged in 150 m off Rottneest Island, West-Australia, by the research vessel DIAMANTINA in 1970. These four areas are remote from each other but embrace the same wide range as *Paramoria guntheri* from South - Australia (Port McDonnell) to West-Australia (Cap Naturaliste) (Fig. 1).

Description.

Shell medium sized (average length: 42 mm), solid, fusiform with back part expanded. Protoconch papilliform, slightly flattened, of 3 1/4 whorls with a white spiral sutural band becoming brown on teleoconch. Three adult whorls with short spire, the last two whorls bearing numerous attenuated knobs (Average 12 on last whorl), limiting a slightly concave subsutural zone. Aperture white, narrow, forming 80% of total shell length. Outer lip thickened and simple. Columellar lip straight with five columellar plaits: Four anterior plaits strong, oblique; posterior fifth only visible by a callosity forming a flattened convexity just behind 4th posterior plait. Inside the shell, this callosity becomes a weak but distinct plait. Siphonal notch narrow, shallow. Fasciole strong. Base colour creamy-white, ornamented with numerous (average 18) slightly wavy brown axial lines, angled and merging in the middle of the body whorl, crossed by two strong spiral bands. Posterior band permanently equal to or stronger than anterior band.

Discussion.

P. johnclarki sp. nov., sympatric with *Paramoria guntheri*, is separable by the constant features presented in Table 1.

These five characteristics of differentiation are stable and always constant. Unlike *Paramoria guntheri*, *Paramoria johnclarki* shows no noticeable variation. The two species seem to share the same ecological niche (i. e. not visible during the inevitably brief time let to scuba divers at these depths)

This close morphological relationship can pose an hypothesis of gradual divergent evolution of a primary sibling species (twin species).

The *P. johnclarki* range in small scattered areas can be interpreted either as insufficient exploration or as a less competitive species, now reduced in relic areas. As a matter of fact, Paleontologic data seems in opposition with the concept of sibling species origine. According to DARRAGH (1988), *P. guntheri* could be direct evolution of a late Oligocene species: *Paramoria strophodon* (McCoy, 1876), and so he relegate *P. guntheri* to a subspecies in the name of *Paramoria strophodon guntheri*. However morphological concordance does not appears evidentiary to the present authors.

On the other hand, *P. johnclarki* can be compared with another Tertiary species: *Paramoria lundeliusae* Ludbrook, 1978. But this shell has neither a fifth columellar plait nor nodulose shoulders, that can make direct conspecificity very dubious. Even if Paleontology does not produce evident conclusion, we must point out how important was the specific diversification of the genus during the late Oligocene.

Supraspecific consideration.

P. johnclarki and *P. guntheri* are morphologically close to species of the genus *Amoria* Gray, 1855: Papilliform multispiral protoconch with a light sutural line, four main columellar plaits, glossy surface. All these features are of *Amoria* type. Anatomy is similar with a Y-shaped radula.

Only the existence of knobs or spines on the shoulder is a separable feature. This closeness encouraged MCMICHAEL (1960) to separate *P. guntheri* from the genus *Nannamoria* Iredale 1929, in which it was linked by COTTON (1949).

	<i>P. johnclarki</i>	<i>P. guntheri</i>
Protoconch:	Dome-shaped, flattened	Dome-shaped, rounded
Shape:	Elongate fusiform, narrow aperture	Large, triangular, broad aperture
Plaits:	5	4
Pattern:	Stable. Axial lines hardly undulated. Posterior spiral band always equal to or stronger than the anterior band.	Variable. Axial lines lightly undulated. Posterior spiral bands rarely equal to but regularly weaker than the anterior band.
Animal colour:	Thin and regular orange, reticulation on cream background.	Thicker and more irregular reticulation on cream background.

Table 1. Features distinguishing *P. johnclarki* from *P. guntheri*

MCMICHAEL (1960) created the genus *Paramoria* for this species and for several different Tertiary fossils. The genus *Nannamoria*, morphologically close, contains several small species of eastern Australia, which feature dense axial lines, numerous and irregular columellar plaits, and radula with tricuspid rachidian tooth.

DARRAGH (1988) synonymized again these two genera, arguing the fact that several fossils do not allow a clear separation of the two, and denying radula as generic criterion for differentiation. WILLAN (1995), when describing a new species, *Nannamoria ranya*, considers the genus *Nannamoria* as an homogeneous group (including *N. amricula* Iredale 1929, *N. gotoi* Poppe 1992, *N. inopinata* Darragh 1979, *N. parabola* Garrard 1960), clearly separate from the taxon *guntheri* (E. A. Smith 1886). He restores the genus *Paramoria* for it on the basis of columellar plaits and radula differences

Though columellar plaits are often variable in several species of *Amoria*, and though the radula is an organ in direct contact with the environment and subject to strong evolutionary pressure that can produce rapid variations within the same genus, we provisionally adopt Willan's opinion and place his new species in the genus *Paramoria* which includes now three species: *P. guntheri* (E. A. Smith 1886), *P. johnclarki* sp. nov., and *P. weaveri* McMichael 1961.

Etymology.

This species is named in honour of John Clark of Esperance, West Australia, who first brought to our attention the existence of this previously unrecorded species, and who has worked tirelessly to obtain specimens for our study.

ACKNOWLEDGEMENTS. We are most grateful for the assistance given through information and specimens supplied by our other diving friends Peter Clarkson and Doug Dixon, without which our task would have been impossible to complete.

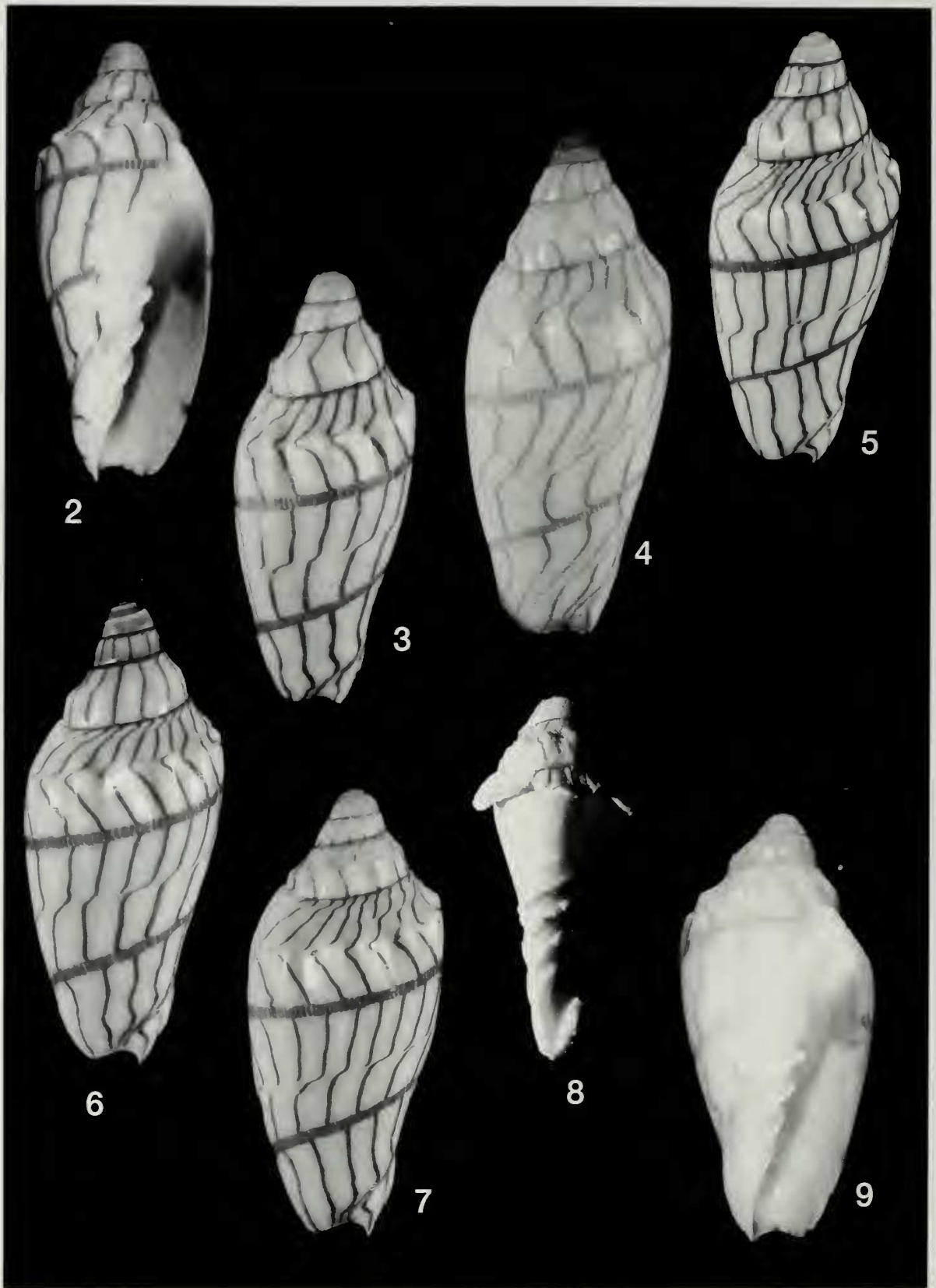
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Fig. 1. Distribution of *Paramoria johnclarki* sp. nov. and *P. guntheri* (E.A. Smith, 1886).

* *P. johnclarki*; ↔ *P. guntheri*.



Figs. 2-3. *Paramoria johncClarki* sp. nov. Holotype, 41.5 mm x 17 mm. WAM. 94-95. Fig. 4. *Paramoria johncClarki* sp. nov. Paratype 1, 46.8 mm x 19.3 mm. Limpus coll. Fig. 5. *Paramoria johncClarki* sp. nov. Paratype 3, 41.2 mm x 17.8 mm. Clark coll. Fig. 6. *Paramoria johncClarki* sp. nov. Paratype 5, 43.4 mm x 17.9 mm. Dixon coll. Fig. 7. *Paramoria johncClarki* sp. nov. Paratype 6, 42 mm x 18.4 mm. Dixon coll. Fig. 8. *Paramoria johncClarki* sp. nov. Columellar lip, showing 4 strong plaits and the fifth weak plait ending in a callous. Fig. 9. *Paramoria johncClarki* sp. nov. Paratype 15, ventral side showing the convex callous area just behind the fourth plait, origine of the fifth plait.

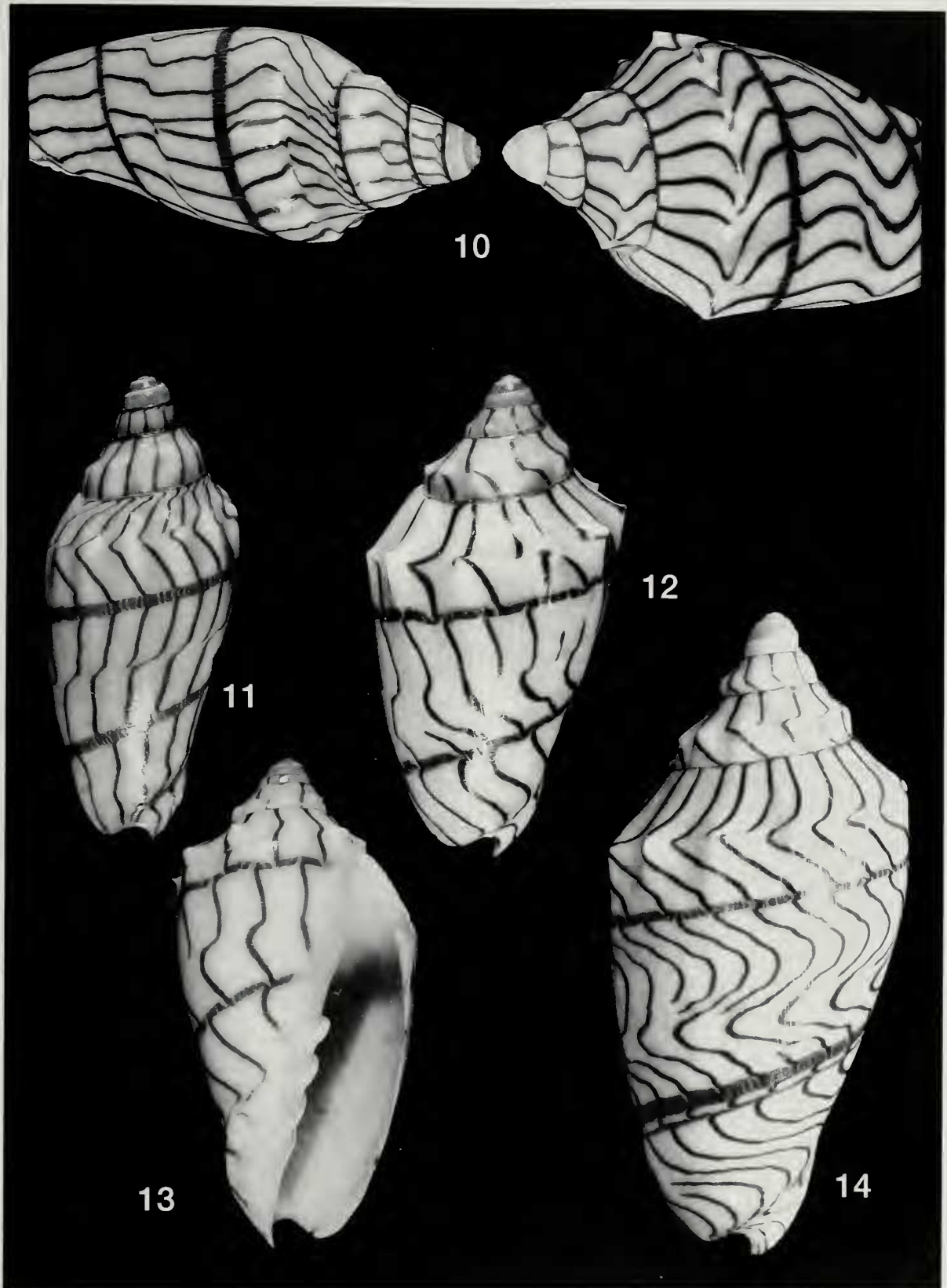


Fig. 10. Left: *Paramoria johncClarki* sp. nov. Right: *Paramoria guntheri* (E. A. Smith 1886) **Fig. 11.** *Paramoria johncClarki* sp. nov., 43.4 mm x 17.8 mm. Archipelago of The Recherche **Fig. 12.** *Paramoria guntheri* (E. A. Smith 1886) form *adocki*, 45.6 mm x 24 mm. Same locality. Outline and comparison between two sympatric specimens. **Fig. 13.** *Paramoria guntheri* (E. A. Smith 1886) form *adocki*, 45.6 mm x 24 mm. Archipelago of The Recherche. Dixon coll. Ventral side showing the flat or slightly concave area just behind the fourth columellar plait, unlike the convex callosity of *P. johncClarki*. **Fig. 14.** *Paramoria guntheri* (E. A. Smith 1886) form *adocki*, 59 mm x 28.4 mm. Thorney Passage, off Taylors Island. Bail coll.

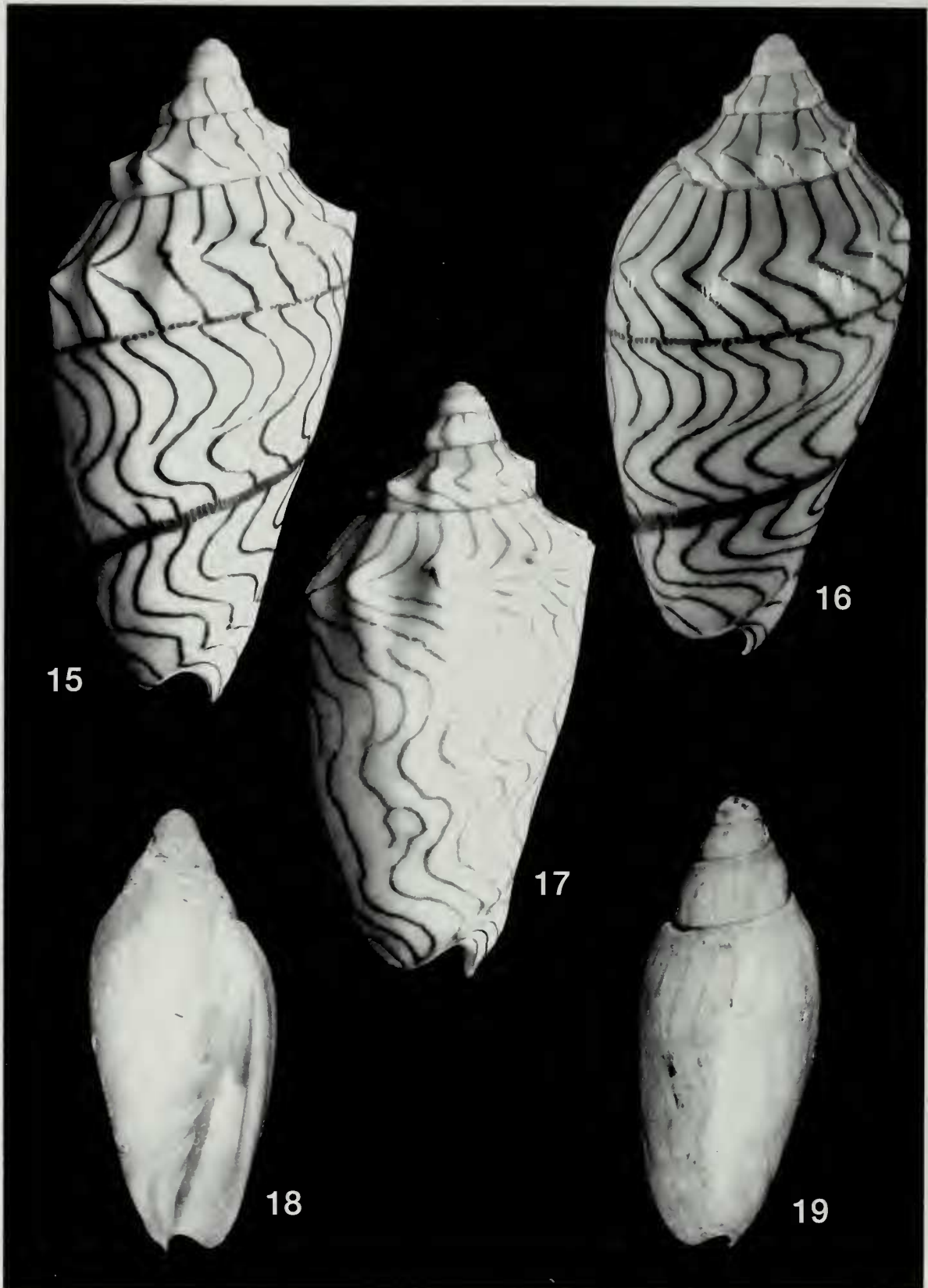


Fig. 15. *Paramoria guntheri* (E. A. Smith 1886) form *adocki*. 60.4 mm x 29.8 mm. Same locality. Fig. 16. *Paramoria guntheri* (E. A. Smith 1886) form *adocki*, 58.4 mm x 27.7 mm. Limpus coll. Same locality. Fig. 17. *Paramoria guntheri* (E. A. Smith 1886). Nominal form without spiral bands. Same locality. Fig. 18. *Paramoria lundeliusae* (Ludbrook 1978). 41.8 mm x 18.2 mm. Roe Plain. Bail coll. Fig. 19. *Paramoria lundeliusae* (Ludbrook 1978). 42.6 mm x 17.3mm. Roe Plain. Limpus coll.



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Fig. 20. *Paramoria johnclarki* sp. nov. Living specimen crawling at daytime in 35 m. Black Island, Esperance, W. A.
 Fig. 21. *Paramoria guntheri* (E. A. Smith 1886): Living specimen at night in 16 m. Taylors Island. Port-Lincoln, W. A.
 Fig. 22. Upper left: *Paramoria stophodon* (McCoy 1876). Lower left: *Paramoria guntheri* (E. A. Smith 1886). Upper Right: *Paramoria johnclarki* sp. nov. Lower right: *Paramoria lundeliusae* (Ludbrook 1978).